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EXTENSION BULLETIN NO. 155 SEPTEMBER, 1945

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GRUBS AND LICE ON CATTLE

BY

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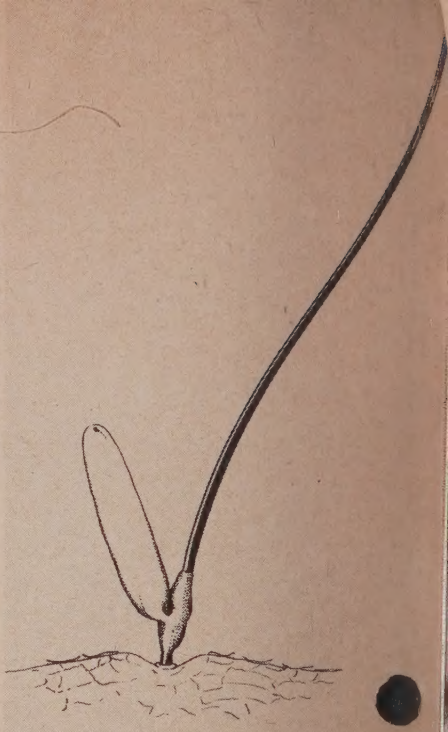
ENTOMOLOGY SECTION

Figure 1.--A mature cattle grub larva removed from its cyst in the back of a cow.



Figrure 3.—Egg of the northern cattle grub above; egg of the common cattle grub below.

Figure 2.—An adult female of the cattle grub.

Grubs and Lice on Cattle

W. E. Shull, H. C. Manis and Glenn C. Holm*

CATTLE grubs and lice annually cost the beef and dairy cattle producers of Idaho hundreds of thousands of dollars in decreases in the production of milk and meat. Injury to the hides and meat lost by trimming results in a lower price for beef sold. Cattle are also weakened by the feeding and living habits of these insects, as well as by disease introduced through feeding punctures and emergence holes in the skin.

By far the greatest loss caused by cattle grubs is due to the egg-laying habits of the heel fly or adult of the grub. When laying eggs on the legs of cattle, they instill into the cattle such fear that the cattle run in terror in an attempt to escape the flies. Cattle will stand in shade or in water much of the time during the fly season in an attempt to avoid the flies. The animals should be feeding and thus producing more meat and milk instead of attempting to escape the flies.

Lice irritate cattle and reduce vitality by withdrawal of blood from the animals. Heavy louse infestations cause cattle to become unthrifty and irritable. Severe rubbing in an attempt to relieve the irritation often produces sores and loss of hair.

Cattle grubs (*Fig. 1*) are the young, or larvae, of heel flies. The adult female heel fly (*Fig. 2*) appear in late spring and early summer to deposit their eggs on the hairs of the legs of cattle. It is this process of attaching the eggs to the hairs by the adult fly which frightens cattle and causes them to run during the fly season, or causes them to seek the protection of mud or water, or to remain in the deep shade in the brush during the warm part of the day during the fly season.

The eggs (*Fig. 3*) hatch, in less than a week, into tiny larvae which crawl along the hair to the skin, where they bore in. The process of boring through the skin is painful to the cattle. After the larvae have entered through the skin, they proceed upward in the connective tissues between the muscle layers toward the abdominal region which they reach in about 2 months, and in several months arrive in the region of the gullet. About 9 months after the egg is laid, the larvae appear in the back. Here they cut holes through the hide and become encysted to form a "bump" on the animal (*Fig. 4*). They remain in this position from 25 to 35 days. Just before the grubs are ready to drop to the ground to pupate, they turn brown to black. When on the ground they crawl under loose soil or debris for protection and then pupate. The larvae changes to a fly during the pupa stage and emerges within 2 to 6 weeks. The females begin laying eggs within a few hours after they emerge. One female may lay as many as 500 eggs.

Cattle grubs first appear in the backs of cattle in Idaho from late January in the lower Salmon River area until mid-April in the upper Snake River area. They begin to appear in late February in much of the southwestern cattle area; in the south-central area in early March; and in the southeastern counties, in late March and April; in northern Idaho they begin to appear in mid-March. Timing of control applications is

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based on the time that the grubs cut holes through the skin; therefore, cattlemen should determine this date by careful and frequent examination of their cattle from early February through late April, depending on the locality.

It has often been said that the fly "bites or stings" the cattle causing them to run. This is not the case, however, for the flies have no stinging organ and their mouthparts are non-functional. The flies do not feed during the adult stage. Many cattlemen also have thought that the larvae were taken into the body of the cattle through the mouth because they are often seen licking their legs during fly season, but this, too, is incorrect. The cattle lick their legs because they are irritated by the larvae boring into the skin. They run with their tails rolled over their backs because they feel the tickling or hear the buzzing of the egg-laying flies.

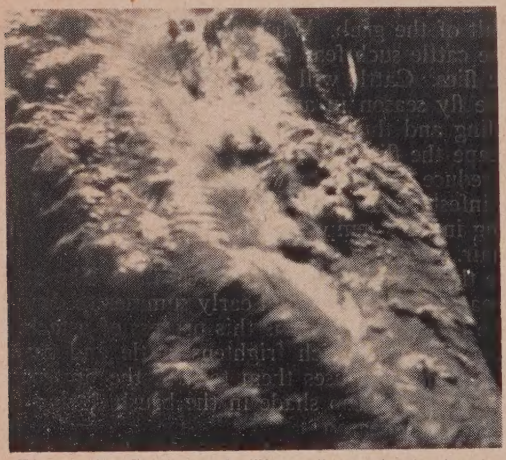


Figure 4.—Cattle grub "bumps" on the back of a steer.

Two species of cattle grubs are found in Idaho, the common cattle grub and the northern cattle grub. The common cattle grub deposits her eggs in small clusters, usually on the legs, while the northern cattle grub deposits her eggs singly on the hairs of the legs, flanks, and belly or other parts of the animal.

Control of Cattle Grubs

Grubs are all inside the cattle during the winter months. None is found in any other location. Theoretically, then, it would be possible to kill all the grubs in all the cattle of any community in one season, if no grubs were allowed to drop to the ground, thus eliminating them entirely. Practically, however, eradication is difficult to attain, but excellent control can be obtained when two, or sometimes three, treatments are applied. *The only time that grubs can be controlled is after they have cut the holes through the skin.*

To get the best results it is necessary to properly treat all of the cattle which are to be together or adjacent to each other during the fly season and to treat all other cattle which might be trailed through a treated area during the time the grubs are dropping to the ground. The adult female fly probably travels less than a mile in search of cattle, but once she finds them, she will stay with them until she has deposited her eggs and dies. Community spraying programs are therefore needed in order to accomplish good control. All cattle in the community must be treated to get the maximum results although there are situations where an indi-

vidual dairyman or beef cattleman can protect his cattle from grubs by individual action. Once all the cattle are treated in a herd or in any community, no cattle should be introduced during the grub season unless they are known to be entirely free of grubs.

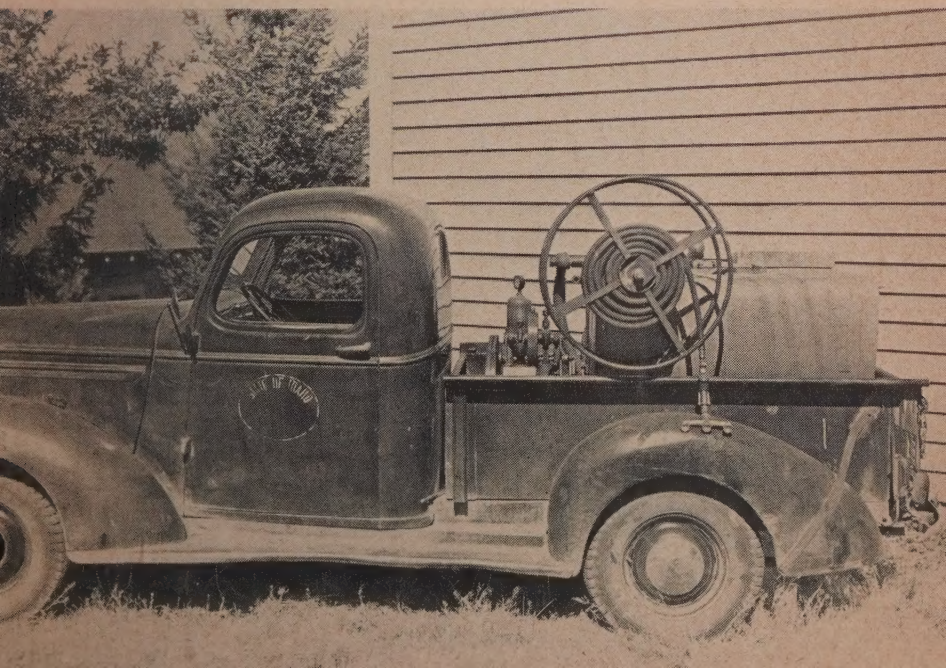
Cattle grubs may be controlled by spraying, by hand washing or by dusting. In Idaho spraying is the most practical method where large herds of cattle are to be treated. When only a few cattle are to be treated, the hand washing or dusting method is used. Dipping has not been practical in Idaho, and dairy cattle should never be dipped because of the danger of injury to the udder.

Spray

Sprays, which are prepared from the finely-ground root of rotenone-bearing plants, such as cube' or derris, or which are prepared from liquid extracts of these roots, are being used almost exclusively in Idaho. Some commercial preparations for cattle grub control contain sulphur and others recommend the addition of sulphur to the spray solution; *sulphur is not necessary for good control.* Sulphur also has some objectionable features as far as the spray operator is concerned in that it sometimes produces a burning irritation to the skin and eyes.

The spray is applied to the backs of the cattle with a power-operated spray pump equipped with an automatic regulator of a type designed to maintain constant nozzle pressure and which can be adjusted readily and accurately so that the pump develops at least 400 pounds of pressure (*Fig.* 5). The pump should be equipped with one or two 50-foot lengths of high pressure spray hose and a spray gun with a 4/64-inch nozzle opening

Figure 5.—Type of spray equipment commonly used in Idaho for cattle louse and cattle grub control.



(No. 4 disk). The spray pump should be supplied with the spray material from a 100- or 150-gallon tank equipped with a good agitator. Cattle spraying outfits are usually mounted on trucks for rapid transportation. Each outfit should be equipped with a suitable tank refiller so that water can be obtained quickly from any available source. Hand filling the tank is too tedious when many animals are to be treated. The pump and all other equipment must be kept in good repair and properly adjusted to maintain the desired pressure and supply the proper amount of liquid for the control operation. *Low pressure and too small volume of liquid will not result in satisfactory grub control.*

The type of spray found to be most efficient for grub control in Idaho is known as the "car washer" type. It is small and easily handled in one hand, resulting in a better spray application. The gun should be adjusted to give the maximum striking pressure with the desired spray pattern. The spray guns may be equipped with a trigger cut-off if desired and when so equipped may save appreciable amounts of spray material. All water and spray materials entering the supply tank should be passed through a fine screen to remove particles which might clog the spray gun, or injure the spray pump.

The spray nozzle should be held not more than 14 to 18 inches above the backs of the animals and a coarse driving spray applied in a round spray pattern of not more than 4 to 5 inches in diameter. Many operators have a tendency to hold the spray nozzle too far away from the back of the animal (*Fig. 6*). The pressure on the spray liquid decreases very rapidly as the material leaves the gun and thus becomes increasingly less

Figure 6.—Treating cattle in a spray corral. Note the distance the operator on the right is from the cattle. Operator on left is doing the job properly.

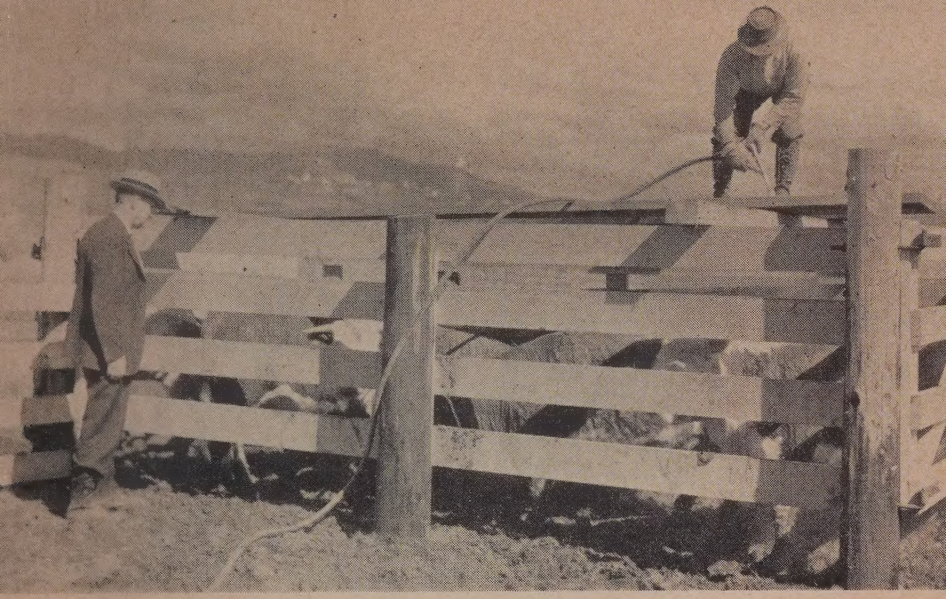


Figure 7.—A small spray corral made of planks and posts. Note the operator is too high above the animals.

Figure 8.—Spray corral made from poles. The pen is too high for most efficient operation.

effective as the distance from the gun to the animal increases. A solid stream is wasteful and may injure the cattle whereas a fine spray will not penetrate a long, dense coat.

For rapid and effective spraying, the cattle should be confined in a spray corral 8 by 10 feet wide, 5½ feet high and as long as convenient, depending upon the size of the herd to be treated (*Figs 7 and 8*). The pens used for large herds should be long enough to hold from 50 to 100 adult animals. The pen should be not more than 80 feet long if 50-foot hose length is being used, so that all animals can be conveniently sprayed without moving the spray outfit. The spray corral should be equipped on top with two catwalks, about 2½ to 3 feet apart, made from planks running the entire length of the pen. The planks should be securely fastened to afford safety for the operator. The spray corral should be equipped with gates at each end which will open the entire width of the corral and hung so that they will operate easily and quickly. The entrance should be made from a small holding corral with suitable drift wings to provide rapid and safe handling of the cattle. Spray corrals may be constructed either from planks and posts or from poles. All posts should be cut off even with the top plank or pole so that the spray hose can be easily dragged across the corral (*Figs. 7 and 8*). The cattle should be crowded tightly to prevent interference with the proper application of the spray materials and to avoid too much movement in the corral.

Figure 9.—Spraying cattle in a chute. This method is not as good as spraying in a spray corral. Note that spray cone is too small and nozzle is being held too close to animal.

Many cattle chutes (*Fig. 9*) have been used for treating cattle, but they have been found to be much less satisfactory than spray corrals because the cattle are less easily handled in them and becaues the animals must be handled too roughly in getting them in and out of the chute. Cattle can be handled much more rapidly in a spray corral. As many as 400 cattle may be treated per hour in a well-constructed spray corral. About 100 or less cattle per hour can be handled in chutes. When several hundred

cattle are to be treated, they are much more efficiently and safely handled by men on horseback rather than on foot (*Fig. 10*).

The Spray Formula—Early recommendations for a spray formula included sulphur or soap in the spray mixture. Recent investigations, however, have shown these materials to be unnecessary if the spray is applied at 400 pounds of pressure and the spray tank has a good agitator. The sulphur is not necessary and may actually reduce the effectiveness of the spray. The following formulae are recommended:

1. Finely-ground rotenone root (5% rotenone) ..... 7½ pounds
   Water ..... 100 gallons
2. Commercial preparations for grub control: Use as recommended by the manufacturer except do not add sulphur.

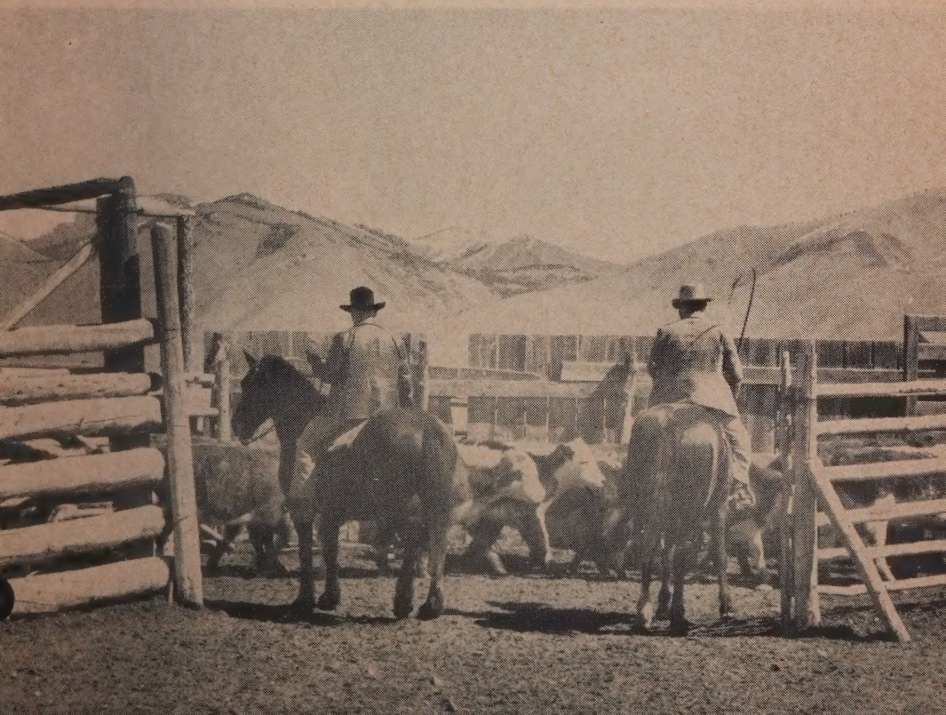
One hundred gallons of spray will treat 200 or more animals, depending upon their size.

Hand Wash

When only a few cattle are to be treated, it is best to treat them by hand (*Fig. 11*). The material is applied from a quart jar, the lid of which has been punctured with several ¼-inch holes. The jar is held in the left hand, and the wash mixture allowed to run onto the backs of the animals while it is brushed into the grub holes with a stiff fiber brush. The mixture is made as follows:

Finely-ground retenone root (5% rotenone) ..... 1 pound
Water ..... 5 quarts

Figure 10.—Cattle are best handled on horseback.



The powdered root is first thoroughly mixed with the water in a pail and then poured into the jar. Three or four ounces of the material per animal is needed. Five quarts will treat 25 to 30 animals.

Dust

Cattle with thin short hair may be treated for grubs with a dust. The dust is applied from a shaker-top can with ¼-inch holes and gently rubbed in a rotary motion with the tips of the fingers as it is being applied. The dust preparation is made as follows:

Finely-ground rotenone root (5% rotenone)	1 pound
Pyrophyllite (325 mesh, Pyrax ABB)	2 pounds

This amount will treat 20 to 25 cattle. The dust treatment is too slow for use on large herds.

Cattle Lice

Two types of lice attack cattle; those which have sucking mouth-parts and subsist by piercing the skin and sucking the blood, and those with chewing mouth-parts which feed on the skin tissues. There are two species of sucking lice and one species of biting lice found on cattle in Idaho. All lice spend their entire life on the animals and are much more numerous during the winter. Sucking lice injure the cattle through loss of blood due to the feeding of the lice; by disturbing normal body temperatures; and by irritating the skin. Biting lice irritate the cattle and thus produce a nervous condition in the animals. These conditions cause serious losses of beef and milk.

Figure 11.—Treating a cow for grub control by the hand wash method.

Control of Cattle Lice

CATTLE SHOULD BE TREATED FOR LICE IN THE FALL TO AVOID EXTENSIVE WINTER TREATMENT, AND IF NO NEW ANIMALS ARE ADDED TO THE HERD WITHOUT FIRST BEING TREATED, WINTER TREATMENT WILL NOT BE NECESSARY.

The best insecticide for louse control is DDT; the second best is rotenone. Either material can be used as a spray or as a dust; however, the application of dust is practical only when treating a small number of animals.

DDT should be used as a spray in a ¼-percent concentration and can be prepared from wettable DDT preparations in the following manner: for example, if the wettable dust concentrate from which the spray is to be made contains 50-percent DDT, then 4 pounds of the concentrate is needed for each 100 gallons of spray.

A rotenone spray can be prepared as recommended for cattle grub control. Commercial preparations of rotenone should be used according to the directions given by the manufacturer. No sulphur is needed for louse control with rotenone.

Any concentration of rotenone, of ½-percent or above, in a dust can be applied for a successful control of lice. Two or three ounces of rotenone dust per animal will be required. DDT used as a dust gives effective control of lice in a 3-percent concentration. One ounce of DDT dust per animal will be sufficient in most cases.

Sprays of either DDT or rotenone can be applied with a power-operated sprayer as for cattle grubs except that the spray pattern can be enlarged to 12 to 16 inches in diameter. Less pressure can also be used if desired. Cattle infested with sucking lice should be sprayed on the underside and around the head. Those infested with biting lice need be sprayed only on back, neck, and head. Cattle should be sprayed both above and beneath if both species are present. Cattle treated with rotenone should be retreated 14 days after the first treatment in order to kill the lice that hatch from the eggs that were present. Rotenone does not kill the eggs and is not effective after 24 to 48 hours. DDT need be applied only once even though eggs are present because it has a residual effect of a long enough duration to kill the newly hatched lice. DDT, therefore, is to be preferred to rotenone for louse control.

In Idaho it is necessary to treat cattle for lice several months before the time when they are treated for grubs if the injury from the lice is to be eliminated. The injury is caused by lice in the fall and winter long before the grubs have cut through the skin. The lice which are present at the time of spraying for grubs are killed when the control material comes in contact with them, but at that time of year they have already done their damage for the season.

COOPERATIVE EXTENSION SERVICE IN AGRICULTURE AND HOME ECONOMICS
OF THE STATE OF IDAHO UNIVERSITY OF IDAHO COLLEGE OF
AGRICULTURE AND UNITED STATES DEPARTMENT
OF AGRICULTURE COOPERATING

Printed and distributed in furtherance of the purposes of the Cooperative Agricultural Extension Service provided for in Act of Congress, May 8, 1914.

Printed by
TRIBUNE PUBLISHING COMPANY
Lewiston, Idaho